

**STUDIES ON THE ZOARCIDAE (TELEOSTEI:
PERCIFORMES) OF THE SOUTHERN HEMISPHERE.
V. TWO NEW SPECIES FROM THE WEDDELL SEA,
ANTARCTICA**

by

M. Eric ANDERSON (1)

ABSTRACT. - Two new species of deep-water eelpouts are described from specimens trawled in the Weddell Sea, Antarctica. One, *Lycenchelys xanthoptera*, is characterized by its yellow pectoral fins, absence of pelvic fins and palatine teeth, double lateral line, intermediate counts of the axial skeleton, and relatively few suborbital pores (5-6). The other, *Pachycara goni*, is characterized by its furcate gill rakers, mediolateral branch of the lateral line beginning on the tail, high precaudal vertebral count (27) and seven suborbital pores, all below the eye.

RÉSUMÉ. - Deux nouvelles espèces de zoarcidés bathyaux sont décrites à partir de spécimens capturés au chalut en mer de Weddell (Antarctique). La première, *Lycenchelys xanthoptera*, se distingue par la couleur jaune de ses nageoires pectorales, l'absence de nageoires pelviennes et de dents palatines, une ligne latérale double, un nombre de vertèbres moyen et relativement peu de pores sous-orbitaux (5-6). La seconde, *Pachycara goni*, se caractérise par des branchiospines fourchues, une branche médio-latérale de la ligne latérale commençant au niveau de l'origine de la nageoire anale, un nombre élevé de vertèbres précaudales (27) et sept pores sous-orbitaux tous situés en dessous de l'oeil.

Key-words. - Zoarcidae, *Lycenchelys xanthoptera*, *Pachycara goni*, Weddell Sea, New species.

Between January and March 1989 several deep-water eelpouts were collected in the Weddell Sea on the third leg of the Southern Ocean cruise ANT-VII of the German Federal Research Institute's vessel Polarstern. This venture was a joint-European investigation, dubbed the "European Polarstern Study" (EPOS). All the eelpout specimens were sent to the author for identification in June 1990. Seven specimens, taken off Kapp Norvegia, Princess Martha Coast, Queen Maud Land, represent two new species to science and are described herein.

METHODS

Measurements were made with an ocular micrometer or dial calipers to the nearest 0.1 mm. Definitions of characters, their observation, measurement, and quantification follow those of Gosztonyi (1977) and Anderson (1982), repeated in the first part of this series (Anderson, 1988). Institutional abbreviations follow Leviton *et al.* (1985). Standard length (SL) is used throughout. Counts of vertical fin rays and vertebrae, and other osteological observations, were taken from radiographs.

(1) J.L.B. Smith Institute of Ichthyology, Private Bag 1015, Grahamstown 6140, SOUTH AFRICA.

LYCENCHELYS XANTHOPTERA N. SP.

(Figs. 1, 2)

Holotype: MNHN 1990-1023, adult male, 242 mm, off Kapp Norvegia, Queen Maud Land, Antarctica, 71°06.2'S, 12°53.8'W to 71°05.7'S, 12°58.4'W, bottom trawl off FFS Polarstern, 771-793 m, 0948-1002 h, 20 Feb. 1989.

Paratypes: MNHN 1990-1024, adult female, 240 mm. - MNHN 1990-1025, immature male, 173 mm. - MNHN 1990-1026, immature female, 167 mm. - ISH 1/91, immature male, 193 mm. LACM 45053-1, adult male, 238 mm. All taken with holotype.

Diagnosis

A *Lycenchelys* with pelvic fins and palatine teeth absent; vomerine teeth present or absent; pectoral fin yellow; lateral line of complete mediolateral and

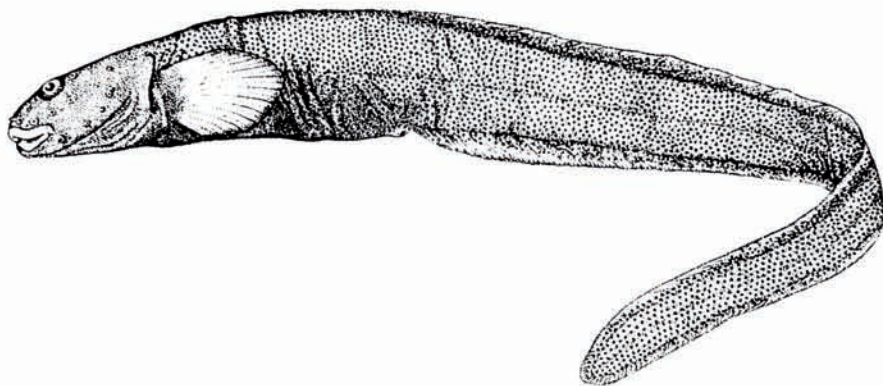


Fig. 1. - *Lycenchelys xanthoptera* n. sp., MNHN 1990-1023, holotype, 242 mm SL, Weddell Sea.

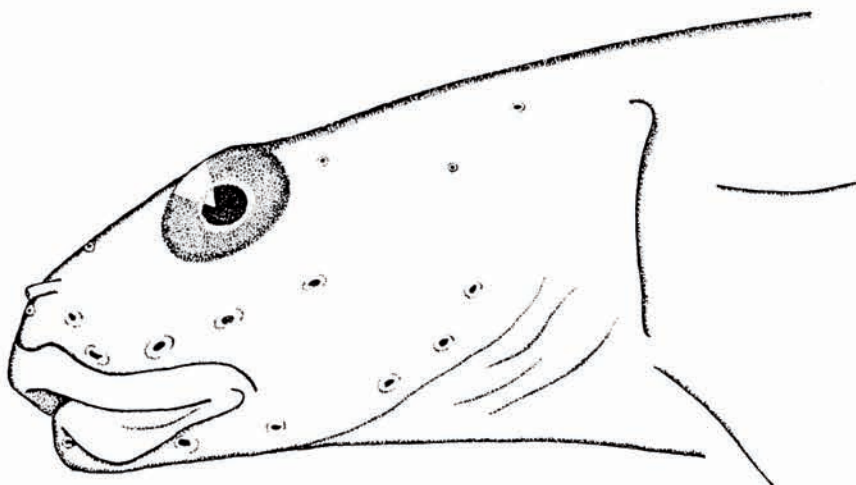


Fig. 2. - *Lycenchelys xanthoptera* n. sp., MNHN 1990-1023, holotype, showing positions of head pores.

ventral branches; suborbital pores 5-6; branchiostegal rays 6; epidermal prickles absent; vertebrae 24-25 + 89-93 = 114-117.

Description

Meristics and morphometrics are presented in Table I; six specimens known. Head ovoid; more acute in adults; snout steeply sloping anteriorly, but wide in adults; eye entering dorsal profile. Mouth subterminal in juveniles; more inferior in adults. Upper jaw extending posteriorly to middle of eye in juveniles; to or near its posterior margin in adults. Flesh at mandibular symphysis not forming cleft. Upper lip continuous across snout; lower lip with well developed lateral lobe in adults. Oral valve weak, posterior margin not reaching edge of vomer, but flesh free of lateral wall of palate to level just posterior to nostril. Jaw teeth small, conical, relatively numerous, none caniniform; premaxillary teeth in five rows anteriorly in holotype, four in other adults, merging into two rows posteriorly; premaxillary teeth in three anterior rows, merging into single row posteriorly in juveniles; dentary teeth in 3-4 irregular rows anteriorly, merging into single row posteriorly in all. Vomerine teeth absent in holotype; in small patch of 15 in other adult male, 2-6 isolated teeth in other specimens. Palatine teeth absent in all. No epidermal prickles on head. Eye circular; spectacle thick, united with flesh of head. Nostril single, with short, unpigmented tube; tube just reaching upper lip. Gill slit nearly vertical, not reaching lower margin of pectoral base; forming slight opercular lobe, about one-quarter eye diameter in length, dorsally; margin of lobe rounded in adults, more acute in juveniles. Gill rakers short, triangular; those of epibranchial and lowermost ceratobranchial acute; dorsalmost on ceratobranchial blunt. Branchiostegal rays 6; four articulating with ceratohyal, two with epihyal. Three pairs of pharyngobranchials. Pseudobranch filaments relatively few, short (absent in one paratype). Pyloric caeca two small nubs.

Origin of pectoral fin at body midline; insertion on abdomen. Posterior margin of pectoral fin wedge-shaped; counting from dorsalmost ray, pectoral rays 5-7 longest; all rays except uppermost 2-4 slightly exserted; ventralmost 5-6 rays thickened. Pelvic fins absent; pelvic bone not appreciably reduced (for zoarcids). Dorsal and anal fins long, low, confluent with caudal; longest rays in either fin about two eye diameters in length. Pterygiophore of first dorsal ray associated with vertebra 4; pterygiophore of first anal ray associated with last precaudal vertebra; 2-4 anal pterygiophores inserted anterior to haemal spine of first caudal vertebra. Last dorsal-fin ray associated with fourth preural vertebra; last anal ray associated with second preural vertebra. Caudal-fin rays 9-11, with one epural bearing two rays; hypural plate with 3-4 upper and 4-5 lower rays.

Scales minute, cycloid, imbedded, extending anteriorly on body to nape (absent on head). Scales covering all the abdomen in juveniles, generally absent in adults except in scattered patches. Scales on unpaired fins extending from two-thirds to three-quarters fin height. Scales present on pectoral base; more densely overlapping in juveniles than adults.

Cephalic lateralis pore system numerically reduced; pores relatively large, rounded except anterior suborbitals and mandibulars (Fig. 2). Eight preoperculo-mandibular pores, four arising from dentary, one from anguloarticular, and three from preopercle. Two postorbital pores, one arising from lateral corner of frontal behind eye (pore 1), the other from lateral extrascapular in front of dorsal edge of gill slit (pore 4). Two supraorbital (nasal) pores on snout, one mesial to nostril tube, the other dorsomesial to nostril. Occipital and interorbital pores absent. Suborbital pores 5-6 on lower ramus of chain under eye; holotype and one juvenile with five lower pores and one from ascending ramus behind eye.

Body lateral line with complete mediolateral and ventral branches. Mediolateral branch originating on vertical about one-half pectoral-fin length anterior to vertical through anal fin origin; ventral branch originating behind last

Table 1. - Counts and proportions of new Antarctic eelpouts. Those of holotype of *Lycenchelys xanthoptera* listed first, range of variation in paratypes in parentheses.

In Percent Standard Length	<i>L. xanthoptera</i>	<i>P. goni</i>
Predorsal length	18.3 (14.9-16.3)	14.5
Preanal length	34.0 (30.8-34.4)	33.0
Prepelvic length	-----	8.9
Body depth	7.9 (6.6-7.9)	6.4
Pectoral-fin length	9.3 (8.7-9.2)	8.5
Pectoral-fin base	3.8 (3.3-3.8)	2.9
Head length	12.6 (11.6-13.5)	11.3
Head width	6.9 (4.6-6.9)	6.5
Head depth	6.8 (5.5-6.8)	6.5
Gill slit length	3.8 (3.2-4.1)	4.0
In Percent Head Length		
Head width	55.1 (36.6-52.2)	57.4
Head depth	54.1 (42.4-50.6)	57.8
Pectoral-fin length	73.8 (66.5-75.3)	75.3
Pelvic-fin length	-----	8.5
Upper jaw length	49.2 (41.2-48.1)	42.2
Snout length	23.9 (22.2-26.8)	21.6
Eye diameter	21.6 (19.1-20.0)	18.6
Gill slit length	30.5 (25.1-30.2)	35.5
Interorbital width	8.5 (7.0-8.0)	7.4
Interpupillary width	32.5 (28.0-30.9)	30.2
Caudal-fin length	9.8 (9.2-20.6)	20.3
Counts		
Vertebrae	24 + 91 = 115 (24-26 + 89-93 = 114-117)	27 + 98 = 125
Dorsal-fin rays	109 (109-111)	118
Anal-fin rays	94 (91-96)	99
Pectoral-fin rays	14 (14-15)	17
Pelvic-fin rays	absent	2
Caudal-fin rays	11 (9-11)	9
Vomerine teeth	0 (2-15)	3
Palatine teeth	absent	10
Gill rakers	2 + 8 (1-2 + 8-11 = 10-12)	1 + 12
Pseudobranch filaments	4 (0-2)	4
Branchiostegal rays	6 (6)	6

(fourth) postorbital pore, coursing unbowed down abdomen to just before anal fin origin, then with slight bow, running above anal base to tip of tail.

Colour uniformly chocolate brown, abdomen blackish-brown owing to black peritoneum. Nostril, lips, and margins of head pores whitish or pale yellow. Unpaired fins chocolate, with irregular yellow or whitish swathes. Pectoral fin pale yellow after 1.5 years in preservative, undoubtedly brighter in life, with small,

irregular brown swathes; margin of pectoral fin with thin, dark brown edging. Eye blue. Lining of orobranchial chamber black.

Etymology

From the Greek "xanthos" (yellow) and "pteron" (wing; used as fin in zoology), alluding to the species conspicuous yellow pectoral fins.

PACHYCARA GONI N. SP.

(Figs. 3-5)

Holotype: MNHN 1990-644, juvenile female, 262 mm, off Kapp Norvegia, Queen Maud Land, Antarctica, 71°08.8'S, 13°48.1'W to 71°09.4'S, 13°49.1'W, Agassiz trawl off FFS Polarstern, 2025-2037 m, 1334-1942 h, 21 Feb. 1989.

Diagnosis

A *Pachycara* with furcate gill rakers; mediolateral branch of body lateral line originating above anal fin origin; seven suborbital pores, all on ventral ramus of bone chain; two pelvic fin rays.

Description

Meristics and morphometrics are presented in Table I; only holotype known. Head ovoid; as wide as high; snout steeply sloping anteriorly; eye entering dorsal profile. Mouth subterminal; upper jaw extending posteriorly to vertical through middle of eye. No mandibular cleft or submental crests. Upper lip continuous across snout; lower lip with well developed lateral lobe. Oral valve weak, posterior margin not reaching edge of vomer, but flesh free of lateral wall of palate to level midway between anterior margin of eye and nostril. Jaw teeth small, conical relatively few (premaxillary teeth 11; dentary teeth 15), none caniniform; premaxillary teeth in two rows anteriorly, merging into a short, single row posteriorly; dentary teeth in three rows anteriorly, merging into single row. Vomerine teeth in small patch; palatine teeth in single row. Eye ovoid; spectacle not thickened, united with flesh of head. Nostril single, with short, unpigmented tube; tube just reaching upper lip. Gill slit inclined, reaching below ventral margin of pectoral base; forming slight, rounded opercular lobe dorsally. Gill rakers stout, furcate, with 2-4 cusps (Fig. 4). Branchiostegal rays 6; four articulating with ceratohyal, two with epihyal. Three pairs of pharyngobranchials. Pseudobranch filaments four, two mere nubs. Pyloric caeca two small nubs.

Origin of pectoral fin just below body midline; insertion on abdomen. Posterior margin of pectoral fin weakly wedge-shaped; counting from dorsalmost

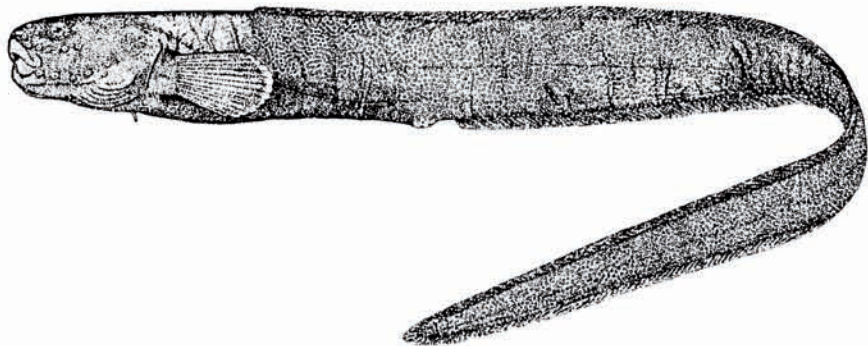


Fig. 3. - *Pachycara goni* n. sp., MNHN 1990-644, holotype, 262 mm SL, Weddell Sea.

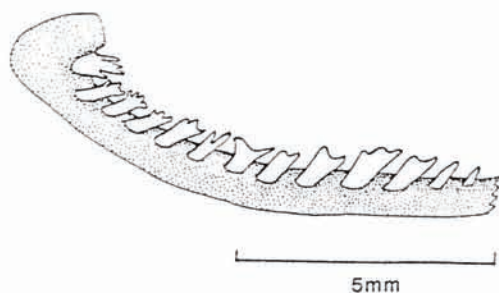


Fig. 4. - Outer surface of right first gill arch of holotype of *Pachycara goni* sp. n., showing furcate gill rakers; gill lamellae not shown.

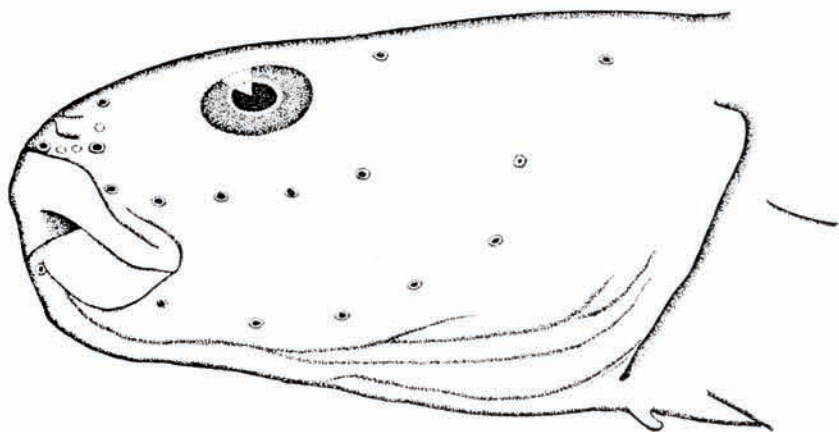


Fig. 5. - *Pachycara goni* sp. n., MNHN 1990-644, holotype, showing positions of head pores.

ray, pectoral rays 6-9 longest; only ventralmost 5-6 rays slightly exerted and thickened. Pelvic fins minute, nipple-like, covered in thick skin. Dorsal and anal fins long, low, confluent with caudal; longest rays in either fin about 1.5 eye diameters in length. Pterygiophore of first dorsal ray associated with vertebra 5; no free dorsal pterygiophores; pterygiophore of first anal ray associated with last precaudal vertebra; three anal pterygiophores inserted anterior to haemal spine of first caudal vertebra. Last dorsal-fin ray associated with third preural vertebra; last anal ray associated with second preural vertebra. Caudal-fin rays 9, with one epural bearing one ray; hypural plate with four upper and four lower rays.

Scales minute, cycloid, imbedded, extending anteriorly on body to just before posterior margin of pectoral fin. Scales present on unpaired fins to about half their height. Scales absent on abdomen and pectoral base.

Cephalic lateralis pores small, rounded; pore numbers in each canal typical for genus (Fig. 5). Eight preoperculo-mandibular pores, four arising from dentary, one from angulo-articular and three from preopercle. Two postorbital pores, one arising from lateral corner of frontal behind eye (pore 1), the other from lateral extrascapular in front of dorsal edge of gill slit (pore 4). Two supraorbital (nasal) pores on snout, one ventromesial to nostril tube, the other dorsomesial to nostril. Occipital and interorbital pores absent. Suborbital pores seven, all arising from ventral ramus of suborbital bone chain under eye.

Body lateral line with mediolateral and ventral branches. Mediolateral branch originating on vertical through anal fin origin; ventral branch originating

behind last postorbital pore, steeply curving down anterior part of abdomen, reaching level it courses to tail tip at about mid-abdomen.

Colour uniformly chocolate brown, including fins. Abdomen blackish-brown owing to black peritoneum. Nostril, lining of orobranchial chamber and margins of head pores unpigmented. Eye blue.

Etymology

Named after Mr. Ofer Gon, J. L. B. Smith Institute of Ichthyology, friend and colleague, in honour of his contributions to knowledge of the cold-water marine fishes of the southern hemisphere.

Comparative remarks

The new species described herein seems closest to the tropical West African species *P. crossacanthum* on the basis of its furcate gill rakers, but differs from that species in its higher counts of the axial skeleton, number of pelvic fin rays and postorbital pores, and the origin of the mediolateral lateral line (see key below). Other differences noted in comparing morphometric features between *P. crossacanthum* and *P. goni*, such as the shorter predorsal, preanal and head lengths, are viewed as the result of ontogenetic variability, coupled with some difficulty in measuring these fishes with precision. In addition, adults of *P. goni*, when encountered, should be expected to have more tooth rows than this juvenile and scales extending to the nape, abdomen, and pectoral base.

Pachycara was recently reviewed by Anderson (1989), who included a key to species shown later to contain an error in couplet 2 (Anderson, 1990: 12). In view of this error, and the fact that two species have been described since 1989, a revised key to the species of *Pachycara* is given below.

KEY TO SPECIES OF *PACHYCARA*

- 1a. Branchiostegal rays six; pseudobranch present.....2
- 1b. Branchiostegal rays four or five; pseudobranch absent.....
.....*Pachycara rimae* Anderson, 1989
- 2a. Occipital (supratemporal) pores absent (rarely present in *P. crossacanthum*).....3
- 2b. Single, mesial occipital pore present..... *Pachycara mesoporum* Anderson, 1989
- 3a. Lateral line with mediolateral and ventral branches; dorsal fin origin (insertion of first pterygiophore) associated with vertebrae 3-8; pterygiophore of first anal ray associated with vertebrae 23-314
- 3b. Lateral line of ventral branch only; dorsal fin origin associated with vertebrae 2-3; pterygiophore of first anal ray associated with vertebrae 20-22
.....*Pachycara suspectum* (Garman, 1899)
- 4a. Dorsal fin origin associated with vertebrae 3-7; precaudal vertebrae 22-30; head length 11.3-19.9% SL.....5
- 4b. Dorsal fin origin associated with vertebra 8; precaudal vertebrae 32; head length 11.4% SL..... *Pachycara shcherbachevi* Anderson, 1989
- 5a. Outer gill rakers on lower limb of first arch simple, blunt, triangular7
- 5b. Outer gill rakers on lower limb of first arch stout, furcate.....6
- 6a. Vertebrae 26-28 + 75-79 = 101-107; pelvic-fin rays 3; postorbital pores 4; origin of mediolateral lateral line near dorsal margin of pectoral base.....
.....*Pachycara crossacanthum* Anderson, 1989
- 6b. Vertebrae 27 + 98 = 125; pelvic-fin rays 2; postorbital pores 2; origin of mediolateral lateral line above anal fin origin..... *Pachycara goni*, n. sp.
- 7a. Origin of ventral lateral line just posterior to last postorbital pore.....8

- 7b. Origin of ventral lateral line on or behind vertical through posterior third of pectoral fin..... *Pachycara sulaki* Anderson, 1989
- 8a. Pelvic fins present9
- 8b. Pelvic fins absent..... *Pachycara bulbiceps* (Garman, 1899)
- 9a. Suborbital pores along ventral ramus of bone chain under eye 6.....10
- 9b. Suborbital pores under eye 5... *Pachycara brachycephalum* (Pappenheim, 1912)
- 10a. Origin of mediolateral lateral line on or behind vertical through pectoral axil ..
.....11
- 10b. Origin of mediolateral lateral line on nape, just posterodorsal to last postorbital pore..... *Pachycara pammelas* Anderson, 1989
- 11a. Precaudal vertebrae 27-31.....13
- 11b. Precaudal vertebrae 22-26.....12
- 12a. Origin of mediolateral lateral line anterior to vertical through posterior margin of pectoral fin; no scales on head, nape or pectoral base
.....*Pachycara garricki* Anderson, 1990
- 12b. Origin of mediolateral lateral line posterior to vertical through posterior margin of pectoral fin; scales present on head, nape, and pectoral base
.....*Pachycara lepinium* Anderson and Peden, 1988
- 13a. Total vertebrae 102-109; caudal vertebrae 73-80; D 96-103; A 77-84; pectoral fin length 63-71% HL..... *Pachycara gymninium* Anderson and Peden, 1988
- 13b. Total vertebrae 111-118; caudal vertebrae 84-88; D 105-112; A 86-92; pectoral fin length 82-97% HL *Pachycara crassiceps* (Roule, 1916)

Acknowledgements. - Specimens and data presented here were collected during the European "Polarstern" Study (EPOS) sponsored by the European Science Foundation and the Alfred Wegener Institute for Polar and Marine Research, Bremerhaven. I thank Guy Duhamel, Muséum national d'Histoire naturelle, Paris, for soliciting my identifications of the zoarcids of the 1989 cruise and Mrs. Elaine Heemstra, J.L.B. Smith Institute of Ichthyology, for her fine illustrations of the new species.

REFERENCES

- ANDERSON M.E., 1982. - Revision of the fish genera *Gymnelus* Reinhardt and *Gymnelopsis* Soldatov (Zoarcidae), with two new species and comparative osteology of *Gymnelus viridis*. *Natl. Mus. Nat. Sci., Publ. Zool.*, 17: 1-76.
- ANDERSON M.E., 1988. - Studies on the Zoarcidae (Teleostei: Perciformes) of the southern hemisphere. I. The Antarctic and subantarctic regions. *Ant. Res. Ser.*, 47: 59-113.
- ANDERSON M.E., 1989. - Review of the eelpout genus *Pachycara* Zugmayer, 1911 (Teleostei: Zoarcidae) with descriptions of six new species. *Proc. Calif. Acad. Sci.*, 46 (10): 221-242.
- ANDERSON M.E., 1990. - Studies on the Zoarcidae (Teleostei: Perciformes) of the southern hemisphere. III. The southwestern Pacific. *J.L.B. Smith Inst. Ichthyol., Spec. Publ.*, (50): 1-17.
- GOSZTONYI A.E., 1977. - Results of the research cruises of FRV "Walther Herwig" to South America. XLVIII. Revision of the South American Zoarcidae (Osteichthyes, Blennioidei) with the description of three new genera and five new species. *Arch. Fisch. Wiss.*, 27(3): 191-249.
- LEVITON A.E., GIBBS R.H. JR., HEAL E. & C.E. DAWSON, 1985. - Standards in herpetology and ichthyology: Part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. *Copeia*, 1985(3): 802-832.

Reçu le 06.03.1991.

Accepté pour publication le 29.05.1991.